Amendments to the Specification

Kindly replace the third paragraph on page 4 with the following full paragraph:

DE 100 53 206 C1 describes a freely programmable logic device, likewise having an individual MR element which contains as magnetic setting elements two magnetic layers. The setting elements are magnetizable individually or jointly according to FIG. 8 by applying signal currents characteristic of logic input variables to an electric conductor. Depending on the prevailing magnetization, this yields a certain electric resistance of the MR element, which can be processed further as a logic output variable. With the logic device according to DE 100 53 206 C1, either the AND/NAND logic function or the OR/NOR logic function can be implemented. To switch between the two logic functions, an additional magnetic field is provided; this field is aligned perpendicular to the layers of the MR element, and the ~~coercitive~~ coercive field strength can be modified with this field with a so-called asteroid switching behavior. The logic function of the logic device changes, depending on whether or not the perpendicular magnetic field is applied. One disadvantage is that an additional magnetization device must be provided for generating the perpendicular magnetic field. Other disadvantages include restrictions with respect to the choice of material, the physical properties, the geometry and the dimensions of the setting elements to achieve the asteroid switching behavior demanded as essential according to DE 100 53 206 C1. In addition, with the logic device according to DE 100 53 206 C1, the additional RESET step is provided before each logic operation.

Kindly replace the second full paragraph on page 10 with the following full paragraph:

This invention can be carried out in general with all magnetic logic devices having at least one magnetic element with multiple magnetically differentiable non-volatile states. For example, a magnetoresistive element has at least two magnetic setting elements with different ~~coercitive~~coercive field strengths on which one of at least two starting states is adjustable with the operator control signal. According to one embodiment of this invention, the

~~coercitive~~coercive field strengths and the current values of the current signals are coordinated so that both setting elements can be adjusted by the operator control signal. Therefore, all four possible configurations of magnetization directions can be achieved with two setting elements. In this mode, both setting elements are freely adjustable ("unpinned"). Alternatively, the ~~coercitive~~ coercive field strength is selected to be so high by one of the setting elements that it cannot be adjusted with the current signals ("pinned" mode). In this case, only two configurations of magnetization settings can be implemented as the starting state and thus only two logic functions are implementable. However, there may be advantages with respect to the simplicity of the design of the logic device.

Kindly replace the first paragraph on page 13 with the following amended paragraph:

Figs. 7A, 7B: ~~a~~ schematic diagrams of ~~a~~ logic circuits ~~according to the invention with~~ a plurality of logic devices, and

Kindly replace the last paragraph on page 16 with the following amended paragraph:

A linkage of the MR element 11 with the inputs 14, 15 and the output 16 that can be used according to this invention is depicted in Fig. 3 as an example. A GMR element with two magnetic layers 12 and 13 with the respective magnetizations M12 and M13 and the respective coerci~~ti~~ve field strengths HC12 and HC13 is provided as the MR element; in the selected example, HC12 is smaller than HC13. The sequence of layers with different ~~coercitive~~ coercive field strengths may be reversed in a modified embodiment. The layers 12 and 13 are magnetically insulated from one another, as is known for conventional MR elements. The voltage drop (measurement voltage) ~~than~~ that can be picked up at the output 16 as output variable O (output) depends on the relative orientation of the two magnetizations with respect to one another.

Kindly replace the second full paragraph on page 17 with the following amended paragraph:

For the diagram shown in Figs. 4 and 5, the relationships between the magnetic fields H_A, H_B and H_C generated by the signal conductors and the ~~coercitive~~ coercive field strengths H_{C12} and H_{C13} are as follows: each field H_A, H_B and H_C by itself is smaller than H_{C12} and the sum of $H_A + H_B$ is greater than H_{C12} but is smaller than H_{C13} and the sum of $H_A + H_B + H_C$ is greater than H_{C13}. As a result, no current can by itself rotate one of the two magnetizations. The currents of the signal conductors A and B rotate the magnetization of layer ~~13~~ 12 only together while the magnetization of layer 13 can be rotated only by all three input currents together. This is true only for currents in the same direction. Currents in opposite directions mutually nullify one another.

Kindly replace the first full paragraph on page 22 with the following paragraph:

Figs. 7A, 7B shows ~~as a~~ details of an inventive logic circuit 30 ~~having~~ a plurality of logic devices 10 arranged in a matrix. Fig. 7A shows ~~E~~each of the logic devices 10 ~~may be~~ equipped with ~~its own~~control circuit 20 by analogy with Fig. 1. Alternatively, Fig. 7B shows multiple or all logic devices 10 ~~may~~ each ~~be~~ connected to a common control circuit 20. The logic devices 10 are preferably configured as an integrated circuit and linked via a network 40 of reading and writing lines as is known per se of conventional FPGA circuits or MRAM arrays.